

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM HUGH COCHRAN, WILLIAM PAUL HOVIS,
MARK DAVID PLUCINSKI
and GLENN WOOD SELLERS, JR.

Appeal No. 2003-2154
Application No. 09/735,895

ON BRIEF

Before WALTZ, KRATZ and MOORE, Administrative Patent Judges.
KRATZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 4, 5, 7-15, 19-24, 35, and 39-44, which are all of the claims pending in this application.

BACKGROUND

Appellants' invention relates to an electrical connector. A printed circuit board arrangement and a computer system, each

including such a connector, are also claimed by appellants. The electrical connector includes a housing with a slot formed therein and a plurality of conductive contact bands arranged within the slot. The contact bands include surfaces having projecting members of a specified height. An understanding of the invention can be derived from a reading of exemplary claims 1 and 15, which are reproduced below.

1. An electrical connector, comprising:
 - a housing having a slot formed therein; and
 - a plurality of conductive contact bands disposed within said slot, each of said contact bands having a surface with a roughness defined by a plurality of macroscopic irregularities, each of said contact bands further having a plurality of projections, said projections of each contact band being electrically engageable, at a plurality of different locations, with a conductive member when the conductive member is fully inserted into the slot so as to establish a plurality of electrical contact points between each respective contact band and the conductive member fully inserted into the slot;
- wherein a width of each said contact band is defined by a distance across the surface of the respective contact band and between two opposing longitudinal edges of the respective contact band; and wherein each said projection has a peak-to-valley height that is between about 10% and about 90% of the width wherein said electrical connector is a card edge connector and, wherein said plurality of contact bands includes a first set of contact bands arranged on one side of the slot, and a second set of contact bands arranged on an opposite side of the slot, each of said projections of said contact bands of the first set projecting toward the contact bands of the second set, and each of said projections of said contact bands of the second set projecting toward the contact bands of the first set; wherein each said projecting member has a peak-to-valley height of about .001 millimeters to about .99 millimeters.

15. A printed circuit board arrangement, comprising:
a first printed circuit board;
a card edge connector disposed on said first printed circuit board, said card edge connector having a housing with a slot formed therein, and having a plurality of conductive bands disposed within the slot, each of said conductive bands being an electrical communication with circuitry of said first printed circuit board; and
a second printed circuit board having a plurality of conductive contact pads disposed along an edge thereof, the edge being insertable within the slot so that the contact pads engage with respective conductive bands so as to electrically couple the first printed circuit board to the second printed circuit board, wherein each contact pad engages with a respective one conductive band at a plurality of different contact points;
wherein said plurality of conductive bands includes a first set of contact bands arranged on one side of the slot, and a second set of contact bands arranged on an opposite side of the slot, each of said contact bands of the first set having a surface facing the contact bands of the second set, and each of each contact bands of the second set having a surface facing the contact bands of the first set;
wherein each of the surfaces has a plurality of projecting members arranged in a pattern for the electrical engagement of each respective contact pad to each respective conductive band at the plurality of different contact points when the edge of the second printed circuit board is fully inserted into slot; and
wherein each said projecting member has a peak-to-valley height of about .001 millimeters to about .99 millimeters.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

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| Blaustein | 2,876,320 | Mar. 03, 1959 |
| Gammel, Sr. (Gammel) | 3,262,082 | Jul. 19. 1966 |
| Devir | 4,877,992 | Oct. 31, 1989 |

Claims 1, 4, 5, 7-15, 19-24, 35 and 39-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gammel in view of Blaustein and Devir.¹

We refer to the brief and reply brief and to the answer for a complete exposition of the opposing viewpoints expressed by appellants and the examiner concerning the issues before us on this appeal.

OPINION

Having carefully considered each of appellants' arguments set forth in the brief and reply brief, appellants have not persuaded us of reversible error on the part of the examiner. Accordingly, we will affirm the examiner's rejection for substantially the reasons set forth by the examiner in the answer. We add the following for emphasis.

Appellants proceed with this appeal while conceding that the claims depending from independent claim 1 stand together therewith. See page 5 of the brief. Moreover, appellants note that independent claims 15 and 35 stand together and with the claims depending therefrom either being acknowledged as standing

¹ While the examiner rejects claims 15, 19-24, 35 and 39-44 separately from claims 1, 4, 5 and 7-14, the same prior art is relied upon. Thus, all of the pending claims stand rejected under § 103(a) over Gammel, Blaustein and Devir.

therewith or not being separately grouped. Consequently, we select claims 1 and 15 as the representative claims on which we shall decide this appeal.

Claims 1, 4, 5 and 7-14

Like the electrical connector called for in representative claim 1, the examiner has determined that Gammel's electrical connector for a circuit board edge includes a housing (10) having a slot (69). See, e.g., page 4 of the answer and figure 3 of Gammel. A plurality of conductive contact bands (60) are disposed within the slot of Gammel. The contact bands include a plurality of projecting bumps (63, fig. 7). The examiner has found that the projecting bumps of Gammel are electrically engageable, at a plurality of different locations, with a conductive member (circuit board) when the conductive member is inserted into the slot. See, e.g., page 4 of the examiner's answer and figures 7-9 and column 3, lines 9-47 and column 4, lines 36-50 of Gammel. Moreover, the contact bands (60) are arranged on opposite sides of the slot of Gammel with the projections (bumps) of a set of contacts on one side of the slot projecting toward a set of the contact band projecting bumps on

the opposite side of the slot. See, e.g., figures 5-7 of Gammel and the corresponding text in the patent specification.

Given the teachings of Gammel (column 3, lines 67-69) concerning the provision of the contact bumps for the purpose of providing electrical connection with an inserted printed circuit board, it is our view that it would have been obvious to one of ordinary skill in the art to arrive at a workable projection height and size for each of the bumps of Gammel so as to arrive at workable electrical contact properties for the bumps and, in so doing, arrive at a projection (bump) height within the ranges, as here claimed.² See In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990) (the determination of workable or even optimum values for result effective variables would be within the ambit of one of ordinary skill in the art); See also In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). Significantly, appellants have not established any

² We observe that appellants, in their specification, page 3, acknowledge that it is known that the degree of electrical contact between a contact band and an associated contact pad of a circuit board depends on the mating force at the contacts and area (size) of contact. It is axiomatic that consideration of whether or not appellants' claims define patentable subject matter over the prior art cited by the examiner must, of necessity, include consideration of the admitted state of the art found in appellants' specification.

criticality for the claimed aspect ratio (peak-to-valley height) and projection heights. See, e.g., page 6, lines 13-20 of appellants' specification.

As for the macroscopic irregularities in the contact band surface that are in addition to the projections, as specified in representative claim 1, we note that the surface of the contact band (60, fig. 7) of Gammel includes other bends (irregularities) besides bumps (63). On this record, we determine that the claimed macroscopic surface irregularities do not serve to specify a patentably distinguishing structure over that suggested by Gammel.³ On this record, we find that the teachings of Gammel furnish sufficient evidence to make out a prima facie case of obviousness. Thus, we need not further discuss the teachings of the additional references applied by the examiner.

Appellants maintain that Gammel does not disclose or suggest projecting member heights and a cleaning function for "surface

³ We note that appellants' original claim 1 and the specification (page 6, lines 5-15), as filed, referred to microscopic surface irregularities in addition to projections (macroscopic irregularities), not both macroscopic irregularities and projections, as now claimed. In the event of further prosecution of the here claimed subject matter before the examiner in this (or a continuing) application, the examiner should determine whether representative claim 1 satisfies the description requirement of the first paragraph of 35 U.S.C. § 112.

roughness macroscopic projections" (brief, page 7). We are not persuaded by those arguments for the reasons stated above.

Moreover, we note that representative claim 1 does not call for a cleaning function for either of the separately claimed macroscopic irregularities or the projections as specified in representative claim 1.⁴ Since we have found that the additional references applied by the examiner are not necessary to render the claimed subject matter prima facie obvious, we need not address the additional arguments directed to those references set forth in the briefs.

As a final point, we observe that no arguments asserting or establishing unexpected results for the claimed subject matter has been presented. Consequently, we sustain the examiner's § 103(a) rejection of claims 1, 4, 5 and 7-14.

Claims 15, 19-24, 35 and 39-44

Representative claim 15 is drawn to an arrangement comprising a first printed circuit board with a card edge

⁴ It is not clear why appellants link the separately claimed projections and macroscopic irregularities in the arguments. In the event of further prosecution of this subject matter, the examiner should also explore whether or not claim 1 and the claims depending thereon comply with the second paragraph of 35 U.S.C. § 112 in that appellants may not be claiming what they regard as their invention.

connector disposed thereon. The connector includes a housing having a slot formed therein and a plurality of conductive bands that communicate with circuitry of the first circuit board being disposed within the slot. The conductive bands are arranged so that a first set of contact bands is located on one side of the slot and a second set of contact bands is on an opposite side of the slot with a surface of one set facing a surface of the other. Each of those surfaces has a plurality of projecting members with peak to valley heights of about .001 to about .99 millimeters.

In addition to our determinations above respecting Gammel, we note that the examiner (answer, pages 5 and 6) has reasonably found that Gammel would have taught or suggested to one of ordinary skill in the art that the electrical connector disclosed therein is capable of connecting printed circuit boards as called for in representative claim 15. Consequently, for the reasons stated in the answer and above, we determine that the teachings of Gammel would have rendered the subject matter of claim 15 prima facie obvious to one of ordinary skill in the art at the time the invention was made.

Moreover, for the reasons stated above, appellants' arguments concerning the height of the projections are not

persuasive. It follows that we shall also sustain the examiner's § 103(a) rejection of claims 15, 19-24, 35 and 39-44.

CONCLUSION

The decision of the examiner to reject claims 1, 4, 5, 7-15, 19-24, 35 and 39-44 under 35 U.S.C. § 103(a) as being patentable over Gammel in view of Blaustein and Devir is affirmed.

No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED

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| THOMAS A. WALTZ |) | |
| Administrative Patent Judge |) | |
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| PETER F. KRATZ |) | BOARD OF PATENT |
| Administrative Patent Judge |) | APPEALS |
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